

Lung sequestration and foregut cyst misleading staging investigations for colonic cancer

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Abstract

We report the diagnostic challenges raised by the uncommon synchronous finding of a lung sequestration and foregut cyst in a 76-year-old male scheduled for radical treatment of his colonic cancer. Following a computed tomography (CT) scan of the chest and a combined positron emission tomography (PET)-CT scan these lesions initially suggested a primary lung cancer with single-station mediastinal nodal disease. At the end of an inconclusive non-invasive diagnostic pathway, histopathologic diagnosis was obtained by video-assisted thoracoscopy, converted into a limited thoracotomy. Even though advanced imaging techniques are providing an overall improvement in diagnostic accuracy, invasive biopsy continues to represent an additional option in complex cases.

Keywords

Lung sequestration; foregut cyst.

Case report

A 76-year-old male presented to the local Department of Lower GI Surgery with a 4-month history of rectal bleeding and a change in bowel habit. Colonoscopy and biopsy revealed a moderately differentiated carcinoma of the recto-sigmoid junction. A preoperative computed tomography (CT) scan of the chest and abdomen in addition showed a soft tissue mass of 2.6 cm in the right upper lung lobe abutting the mediastinum (Fig. 1). A sub-carinal lesion measuring 2.8 cm by 3.7 cm and considered to be a mediastinal lymph node was also reported (Fig. 2). In summary these appearances were thought to be highly suggestive of a metastatic right upper lobe lung cancer. The patient was an ex-smoker (10 pack/years). No history of cough, dyspnoea, chest pain, sputum production or asbestos exposure was noted.

Differential diagnoses included mediastinal lymphadenopathy secondary to the colonic cancer and benign lung and/or mediastinal lesions. Bronchoscopy and trans-bronchial fine needle aspiration of the sub-carinal lesion, which was considered to be inaccessible for a mediastinoscopy, turned out to be inconclusive. A combined positron emission tomography (PET)-CT scan



Fig. 1. CT scan of the chest showing right upper lobe lung lesion.

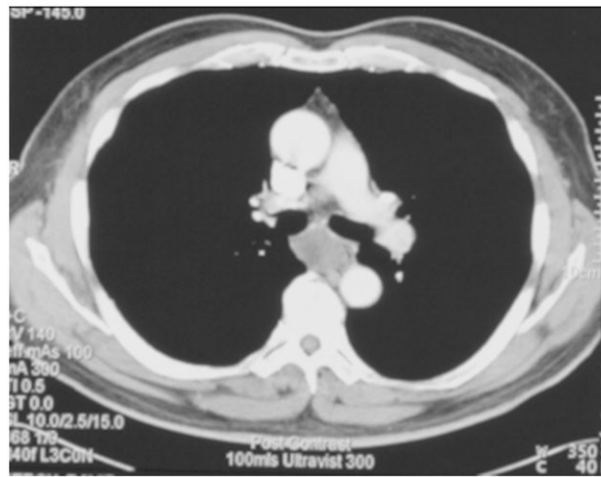


Fig. 2. CT scan of the chest showing a sub-carinal lesion.

showed intense activity corresponding to the recto-sigmoid segment, consistent with the known colonic cancer, but no abnormal focal activity elsewhere. The intrathoracic lesions were not fluorodeoxyglucose (FDG) avid. However, even the combined PET-CT scan report suggested this to be a stage IIIA lung cancer mainly based on CT criteria and despite both thoracic lesions being FDG-negative^[1]. The low attenuation of the lung tumour on the CT component was interpreted as suggesting necrosis. In addition when comparing the original CT scan with the combined PET-CT an increase in size of the right upper lung lobe lesion was reported. Given the highly suspicious radiologic findings at this point a video-assisted thoracoscopy (VATS) was attempted and for technical reasons had to be converted into a limited thoracotomy. Surprisingly the sub-carinal lesion turned out to be a cyst filled with dense mucus (Fig. 3). Histopathologically this specimen was found to have a wall of smooth muscle lined with squamous metaplastic epithelium and was labelled a congenital foregut cyst. The wedge excision of the upper lung lobe lesion revealed cyst-like spaces lined with simple mucinous epithelium surrounded by fibrosis and parenchymal lung tissue, consistent with an intralobar lung sequestration.

Radical surgery for the colonic cancer was performed and the final TNM staging was pT3, pN0, M0, Dukes B.

Discussion

Intralobar lung sequestrations represent about 6% of all pulmonary malformations and only 6–12% are found in association with additional congenital anomalies, which underlines the rarity of their joint finding^[2]. Lung sequestration and foregut cysts are congenital abnormalities.



Fig. 3. Excised mediastinal lesion (foregut cyst).

We differentiate between extralobar (ELS) and intralobar (ILS) lung sequestration; the latter are surrounded by lung parenchyma and covered by visceral pleura, the former are defined as an extrapleural mass of embryonic lung and as such may even be found in subdiaphragmatic position. Patients with ELS commonly present within the first year of age, whereas more than 50% of ILS cases become symptomatic only after adolescence. The main symptom of ILS is a recurrent chest infection. CT scans are reported to have an accuracy of 90% in the diagnosis of pulmonary sequestration.

In an adult, bronchogenic cysts typically present as an incidental mass most commonly in the mediastinum (85% of cases) or in the lung. Radiologically they appear well circumscribed with water or soft-tissue density and their differential diagnoses include necrotic lymphadenopathy, cystic lung disease, or lung abscess^[2].

A number of imaging techniques such as CT, FDG-PET and combined CT-PET scan, magnetic resonance imaging (MRI) and angiography are commonly used to characterise intrathoracic lesions. CT and PET scans or a combination of both are the preferred staging investigations in case of an assumed or confirmed intrathoracic malignancy.

A meta-analysis considering the evaluation of focal lung lesions with FDG-PET and including 1474 lesions of any size reported a mean sensitivity and specificity of 96% and 74%^[3]. The diagnostic accuracy for the staging of lung primary and nodal disease using integrated PET-CT was found to be 86% and 84% respectively in a recent study including 106 patients with non-small cell lung cancer^[4].

For the assessment of purely mediastinal nodal disease, diagnostic accuracy has been published as 94% for PET-CT, 89% for PET, and 64% for stand-alone CT. Differences in the accuracy of overall tumour staging between PET-CT and PET ($p=0.031$) and PET-CT and CT ($p=0.08$) were found to be significant, using pathologic findings as the gold standard^[5]. Christian *et al.*^[6] reported PET-CT to be accurate in detecting metastatic spread from a colonic carcinoma in 89% of cases investigated.

Accurate staging of solid malignant tumours is a mandatory prerequisite for successful treatment and given its high diagnostic yield PET is an integral component of preoperative staging. However it does not always replace it.

Gambhir *et al.*^[7] have drafted a decision analysis model in the context of a cost-effective management of solitary pulmonary nodules. They point out that if the clinical pre-test likelihood of malignancy is greater than 50% the post-test probability of disease in cases with a negative PET will exceed 10%. Consequently in these cases an invasive biopsy is recommended regardless of the FDG-PET result.

Teaching point

Advanced imaging techniques provide an overall improvement in accurately evaluating indeterminate intrathoracic lesions, but in complex cases an invasive biopsy might still be required to provide a definitive histologic diagnosis. The multidisciplinary team (MDT) represents

the appropriate setting for review and discussion of these images. Even combined PET-CT continues to reveal deficits in sensitivity and specificity, and as a result video-assisted thoracoscopy and mediastinoscopy should remain integral parts of the diagnostic algorithm. This is particularly important if the outcome of the algorithm impacts on the MDT's choice of radical or palliative treatment for the patient.

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